

ANHUI ZHONGDIAN ELECTRIC CO.,LTD

SINCE 2001

ACTIVE POWER FILTER



POWER QUALITY SOLUTION



OVERVIEW

Active Power/Harmonic Filter(APF/AHF) is a perfect comprehensive solution to power quality problems such as harmonic wave, reactive power, and 3 phase load unbalance. APF is connected in parallel in power grid, to detect the harmonic wave in real time, generate the reverse-phase compensation current through the converter, and dynamically filter the harmonic wave. The operation of APF is unaffected by power grid structure and load type, and it will not produce harmonic oscillation with the system, thus perfectly realizing harmonic wave control of various loads. APF can also realize dynamic reactive compensation, and control the capacitor switching, to improve the power factor. Meanwhile, APF has the function of controlling the 3 phase load current unbalance, thus comprehensively solving various power quality problems with power grid.

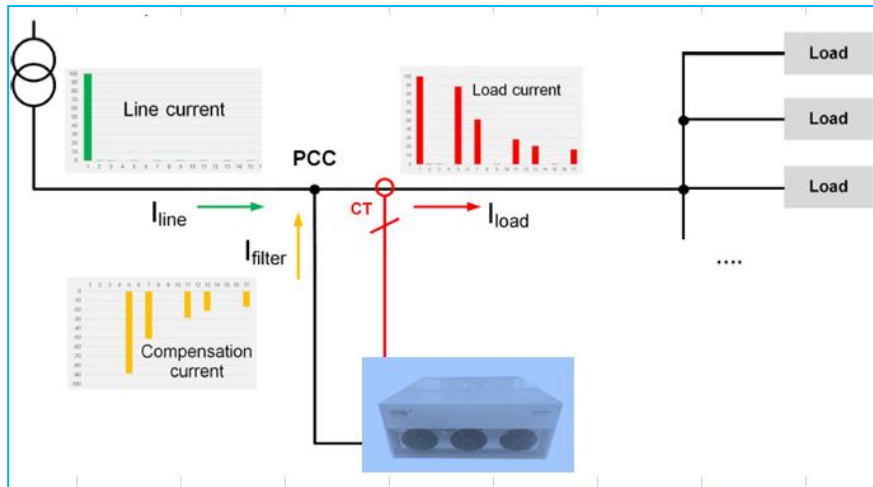
TYPICAL APPLICATIONS

- ◆ Harmonics occur usually as follows,
 - Overheating of transformers and conductors
 - Generator instability
 - Capacitor failure
 - Nuisance tripping of fuses and circuit breakers
 - Damage to or failure of sensitive electronic equipment including drive failure
 - Telephone interference
 - Motors experiencing overheating, audible noise and reduced service life
 - High energy costs
 - Downtime and loss of production due to equipment instability.
- ◆ Harmonics are easy found in following industry, especially industrial motors.

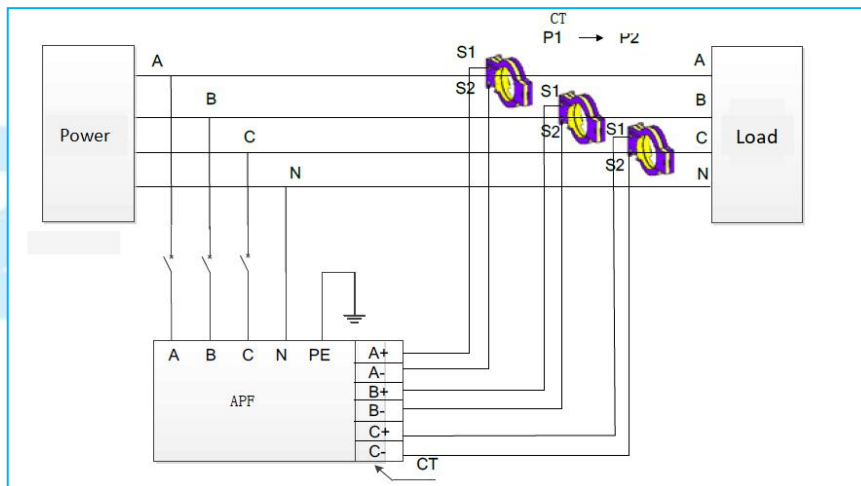


TYPICAL ELECTRICAL SCHEMATIC

◆ APF for Central Compensation



◆ Typical Design Scheme



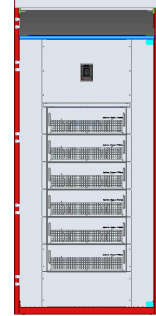
◆ Working Principle



KEY FEATURES

◆ EXCELLENT FILTERING PERFORMANCE

- Filtering rate is greater than 97%.
- Multiple compensation:
Harmonic filter, reactive compensation and 3 phase unbalance compensation.

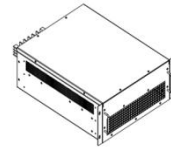


◆ MULTIPLE PROTECTION

Short circuit, over voltage, under voltage, over frequency, under frequency, phase sequence error and current inverted sequence protection.

◆ MODULAR DESIGN

- Ultra-compact design, wall and rack mount installation, easy to use in new or existed switch room upgraded.
- Modular structure with highest reliability of system.
- 3P3W and 3P4W adapted by same modules and same capacity.



◆ INTELLIGENT FFT

Unique intelligent FFT algorithm automatically study the electrical system impedance, to prevent system from resonance, high system reliability.

◆ GRAPHICAL USER INTERFACE

- Cabinet: 7 Inch central HMI
- Display electrical system voltage, current, frequency, before and after THDi, Apparent/Active/Reactive Power, etc.



APF Panel



APF Modular

DATA SHEET APF MODULAR					
Number of phases (system input)	3-phase 3-wire or 3-phase 4-wire				
Mains frequency	50/60Hz				
Mains voltage	400 V ±20%				
Response time	<5ms				
Harmonic mitigation performance	2 nd to 50 th harmonic				
Filter Efficiency	>97%				
Total harmonic current distortion THDi	<5%				
Reactive power compensation Rate	>0.98(inductive and capacitive compensation)				
3 phase unbalance compensation effect	<5%				
Active Loss of system	<3%				
Inverter topology	IGBT				
Controller	DSP+FPGA				
Current transformer placement	Mains side or load side				
Communication interface	Modbus Protocol,RS485				
Rated current of Modular	30A	50 A	75 A	100 A	150A
Weight	30kg	30kg	35kg	40kg	45kg
Self-protection	Yes				
Over heat protection	Yes				
Over/under voltage protection	Yes				
Over/under frequency protection	Yes				
Noise level	<60 dB (depending on load situation)				
Relative humidity	<95% non-condensing				
Temperature	-20 ~70°C				
Cooling type	Air cooling				
Dimensions cabinet	440 mm × 641 mm × 230.5mm (w × d × h)				
Mounting	Wall-mounted or Rack mounted				
Ambient conditions	<1000m; Up to 4000m with derating 1% per 100m				
Protection class	IP20				
Certification	ISO9001,Type Test Report				
	EN 50178:1997/IEC50178:1997				
Design standards	EN61000_6_2(2005)/EN55011,Group1,ClassA				
	IEC61000_6_2(1999)/CISPR11,Group1,GlassA				
	EN50091-3/IEC62040-3/AS62040-3(VFI SS 111)				



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Inverter topology	IGBT
Controller	DSP+FPGA
Communication interface	Modbus Protocol,RS485
Rated current of Panel	150A 250A 350A 450A 550A 200A 300A 400A 500A 600A
Self-protection	Yes
Over heat protection	Yes
Over and under voltage protection	Yes
Noise level	<60 dB (depending on load situation)
Relative humidity	<95% non-condensing
Temperature	-20 ~70°C
Cooling type	Air cooling
Dimensions cabinet	800/1000 mm × 1000/800 mm × 2200mm (w × d × h)
Mounting	Free standing
Ambient conditions	<1000 m without derating; Up to 4000m with derating 1% per 100m
Protection class	IP20
Certification	ISO9001, Type Test Report
Design standards	EN 50178:1997/IEC50178:1997 EN61000_6_6(2005)/EN55011,Group1,ClassA IEC61000_6_2(1999)/CISPR11,Group1,GlassA EN50091-3/IEC62040-3/AS62040-3(VF1 SS 111)



REFERENCE TABLE FOR CENTRAOL MANAGEMEN

Following are Experienced Values of Distortion Factors of Harmonic Currents in Industries.

Transformer capacity / KVA	APF Configuration Capacity (A)				
	Building Subway	Medical / Tire / Metallurgy	Manufacture factory / New energy /Automobile	Performing arts center / Silicon manufacture / Oil exploitation	Chemical
THDi	10%	15%	20%	25%	30%
200	35	50	50	60	100
250	35	50	75	75	100
315	50	60	100	100	125
400	50	75	100	125	150
500	60	100	125	150	180
630	100	125	160	200	250
800	100	150	200	250	300
1000	125	200	250	300	350
1200	160	250	300	400	450
1600	200	300	400	500	550
2000	250	360	500	600	700
2500	300	450	600	700	850





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